

Remarks

Claims 1-9 and 13-23 are pending.

Claims 1-9 and 13-23 are rejected on the ground of non-statutory obviousness type double patenting over US Application No. 10/485,840, now US patent 7,326,793.

Claims 1-9 and 13-23 are rejected under 35 USC 103(a) over Morton, et.al., WO 03/022848 and Bansal, Raj. Synthetic Approaches in Org Chem, page 409, 1996. US patent 7,326,793 and Morton WO 03/022848 disclose the preparation of compounds which are the same or are similar to compounds prepared by the instant method. Bansal claims that spectacular results have been obtained using microwave heating greatly reducing the time for reaction. The present Action states coupled with the previously cited Morton, the disclosure of Bansal makes the instant process obvious.

Applicants respectfully traverse the rejections.

Applicants and the Examiner disagree as to whether replacing the standard heating methods of US 7,326,793 and Morton with the instant microwave activation constitutes "merely modifying processing conditions such as temperature ... absent a showing of criticality". Bansal is cited to show that the use of microwave activation would be expected to show significant improvements over conventional processes.

Applicants respectfully point out that while Bansal mentions the potential use of microwave technology for improving the "rates of many chemical reactions", only Diels-Alder reactions, and only one in particular, are specifically mentioned. Applicants also respectfully note that Bansal references other citations to similar electrocyclic reactions, such as the Claisen reaction, and to ene reactions.

Applicants respectfully submit that these reactions are different from the instant reaction forming a 5-membered ring lactone. Applicants' contend that it would not be clear, given the well known unpredictability of chemical reactions, whether a change in procedure that improves the rates of one type of reaction would also improve the rates of a different reaction.

That is, while it may be generally known that microwave activation might improve some reactions, there is no way to predict, prior to Applicants' invention, whether the use of microwave would improve the instant reaction.

To demonstrate "criticality", Applicants again respectfully point to the bottom paragraph of page 1 of the Specification: The yield of the ring closure of ethyl 4-benzoyl-4,5-dihydro-5-oxo-2-phenylpyrrole-3-carboxylate to 3,6-diphenylfuro[3,4-c]pyrrole-1,4-dione is, for example, **increased from 40 to 86 % by the microwave assisted process** according to the present invention. Moreover, we have observed that the preparation of this lactone (a versatile DPP precursor) **requires lesser time (1 to 10 minutes) under microwave irradiation while ring closure of the compound of formula II takes 60 hours when conducted without microwave radiation** (conventional method). In addition, the solvent can be omitted in the microwave assisted ring closure, which makes the above process further cost effective.

Applicants respectfully submit that an increase in yield of 40 to 86% and a reduction in reaction time of 60 hours to 10 minutes represent a dramatic and unpredictable improvement and further submit that these dramatic improvements can be considered a "showing of criticality" rendering the instant process patentable.

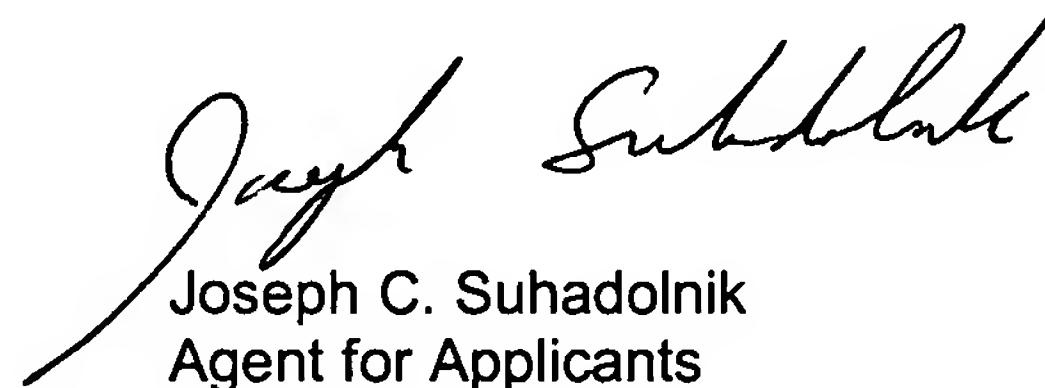
Applicants therefore respectfully maintain that the cited art, taken alone or together, does not offer sufficient guidance to lead one skilled in the highly unpredictable chemical arts to conclude that such drastic improvements should be necessarily expected by using microwave activation rather than conventional heating. Thus, Applicants believe that the improvements of the inventive ring closing process constitute a patentable modification over the cited art.

In light of the above discussion, Applicants respectfully submit that the obviousness type double patenting rejections over US Application No. 10/485,840, now US patent 7,326,793, have been addressed and are overcome in that the instant process and its improvements are not suggested.

Applicants also respectfully submit that the rejections under 35 USC 103(a) over Morton, et.al., WO 03/022848 and Bansal, Raj. Synthetic Approaches in Org Chem, page 409, 1996 have been addressed and are overcome in that the instant lactone forming ring closure is different from the reactions known to benefit from microwave activation.

In light of the above discussion, Applicants respectfully submit that all rejections are overcome and kindly ask the examiner to withdraw all rejections and find claims 1-9 and 13-23 allowable. In the event that minor amendments will further prosecution, Applicants request that the examiner contact the undersigned representative.

Respectfully submitted,



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